

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application:

LISTING OF CLAIMS:

1. (Currently Amended) A network access server (NAS), the NAS comprising:
an HGS identifier configured to identify a home gateway server (HGS) of an Internet service provider (ISP), the HGS associated with a home domain to which a request for an IP address is to be transmitted, the ISP and a Network Access Provider (NAP) of the NAS being separate, wherein the HGS identifier is configured to identify the HGS responsive to log-in information provided by a user;

an IP address requester configured to request an IP address from the HGS, the HGS maintaining a pool of IP addresses for allocation to authorized users, the IP address requester configured to transmit the user's authentication information to the HGS with the request for an IP address from the HGS;

an IP address relay configured to receive an IP address allocated to the user from the HGS and to relay the allocated IP address to the user; and

a memory coupled with the IP address requester and the IP address relay, the memory storing an association between an identification of the user and the IP address allocated to the user, the NAS configured to provide a user with access and connection to a global data communications internetwork,

further comprising:

a receiver configured to receive periodic queries from the HGS about the status of the user connection to the NAS; and

a responder responsive to the periodic queries and configured to inform the HGS that the user is still connected to the NAS.

2. (Previously Presented) The network access server of claim 1, further comprising:

a detector configured to periodically detect connection of the user to the NAS, the detector further configured to update the association in the memory to indicate that the allocated IP address is no longer in use if the connection of the user is lost.

Claim 3 (Cancelled).

4. (Currently Amended) The network access server of claim 1, further comprising:

a receiver configured to receive periodic signals from the user;
a forwarder responsive to the receiver and configured to forward information to the HGS that the user is still connected to the NAS.

Claims 5-8 (Cancelled).

9. (Previously Presented) The network access server of claim 1, wherein the HGS identifier is responsive to call information associated with the incoming line used by the user to access the NAS.

Claims 10-12 (Cancelled).

13. (Previously Presented) The network access server of claim 1, further comprising:

a generator, responsive to the receipt of a disconnection request from the user, the generator configured to generate and send a notice to the HGS that the user is no longer connected to the NAS.

Claims 14-20 (Cancelled).

21. (Currently Amended) A method comprising:

- establishing a connection with a user;
- receiving authentication information from the user, the authentication information including a user identification;
- storing the user identification in a memory;
- determining a home domain for the user, wherein the determining is responsive to the receiving;
- transmitting the authentication information from the user with a request for an LP address from a home gateway server (HGS) of an Internet service provider (ISP), the HGS associated with the home domain, the ISP and a Network Access Provider (NAP) of the NAS being separate, the HGS maintaining a pool of IP addresses for allocation to authorized users;
- receiving an IP address allocated to the user from the HGS;
- creating and storing an association between the user identification and the allocated IP address in the memory;
- transmitting the allocated IP address to the user; and
- providing the user with access and connection to a global data communications internetwork,

further comprising:

- receiving periodic queries from the HGS about the status of the user connection; and
- responding to the periodic queries that the user is still connected.

22. (Previously Presented) The method of claim 21, further comprising:

- detecting a continuing connection with the user; and
- sending periodic keep-alive messages associated with the user to the HGS as long as the continuing connection with the user is detected.

Claim 23 (Cancelled).

24. (Previously Presented) The method of claim 21, further comprising:
receiving periodic in-use signals from the user; and
forwarding information to the HGS that the user is still connected.

Claim 25 (Cancelled).

26. (Currently Amended) A program storage device readable by a machine, tangibly embodying a program of instructions readable by the machine to perform a method, the method comprising:

- establishing a connection with a user;
- receiving authentication information from the user, the authentication information including a user identification;
- storing the user identification in a memory;
- determining a home domain for the user, wherein the determining is responsive to the receiving;
- transmitting the authentication information from the user with a request for an IP address from a home gateway server (HGS) of an Internet service provider (ISP), the HGS associated with the home domain, the ISP and a Network Access Provider (NAP) of the NAS being separate, the HGS maintaining a pool of IP addresses for allocation to authorized users;
- receiving an IP address allocated to the user from the HGS;
- creating and storing an association between the user identification and the allocated IP address in the memory;
- transmitting the allocated IP address to the user; and
- providing the user with access and connection to a global data communications internetwork,

further comprising:

receiving periodic queries from the HGS about the status of the user connection; and

responding to the periodic queries that the user is still connected.

27. (Previously Presented) The program storage device of claim 26, wherein the method further comprises:

detecting a continuing connection with the user; and

sending periodic keep-alive messages associated with the user to the HGS as long as the continuing connection with the user is detected.

Claims 28-44 (Cancelled).

45. (Currently Amended) An apparatus for providing an IP address to a user in a data communications network, the apparatus comprising:

means for establishing a connection with a user;

means for receiving authentication information from the user, the authentication information including a user identification;

means for storing the user identification in a memory;

means for determining a home domain for the user, wherein the determining is responsive to the receiving;

means for transmitting the authentication information from the user with a request for an IP address from an HGS associated with the home domain on behalf of the user, the HGS maintaining a pool of IP addresses for allocation to authorized users;

means for receiving an IP address allocated to the user from the HGS;

means for creating and storing an association between the user identification and the allocated IP address in the memory;

means for transmitting the allocated IP address to the user; and

means for providing the user with access and connection to a global data communications internetwork,

further comprising:

means for receiving periodic queries from the HGS about the status of the user connection; and

means for responding to the periodic queries that the user is still connected.

46. (Previously Presented) The apparatus of claim 45, further comprising:

means for detecting a continuing connection with the user; and

means for sending periodic keep-alive messages associated with the user to the HGS as long as the continuing connection with the user is detected.

Claim 47(Cancelled).

48. (Currently Amended) The apparatus of claim ~~[[47]]~~ 45, further comprising:

means for receiving periodic in-use signals from the user; and

means for forwarding information to the HGS that the user is still connected.

Claim 49 (Cancelled).

50. (Previously Presented) The network access server in accordance with claim 2, further comprising:

a keep-alive sender coupled to the detector, the keep-alive sender configured to periodically inform the HGS that the user is still connected to the NAS until the connection is lost.

Claim 51 (Cancelled).

52. (Previously Presented) The network access server in accordance with claim 1 wherein the IP address requester is configured to use Remote Authentication Dial In User Service (RADIUS).

Claim 53 (Cancelled).

54. (Previously Presented) The method in accordance with claim 22, further comprising:

updating the association in the memory to indicate that the allocated IP address is no longer in use if the connection is lost.

55. (Previously Presented) The method in accordance with claim 21, further comprising:

receiving a disconnection request from the user; and
generating and sending a notice to the HGS that the user is no longer connected.

Claim 56 (Cancelled).

57. (Previously Presented) The method in accordance with claim 21, wherein the determining is in response to call information associated with an incoming line used by the user.

58. (Previously Presented) The apparatus in accordance with claim 45 wherein the means for requesting includes:

means for transmitting the user' s authentication information to the HGS.

59. (Previously Presented) The apparatus in accordance with claim 46, further comprising:

means for updating the association in the memory to indicate that the allocated IP address is no longer in use if the connection is lost.

60. (Previously Presented) The apparatus in accordance with claim 45, further comprising:

means for receiving a disconnection request from the user; and

means for generating and sending a notice to the HGS that the user is no longer connected.

Claim 61 (Cancelled).

62. (Previously Presented) The apparatus in accordance with claim 45, wherein the means for determining performs in response to call information associated with an incoming line used by the user.

63. (Previously Presented) The network access server in accordance with claim 1 wherein the memory stores the association as long as the user maintains the connection with the NAS.

64. (Previously Presented) The network access server of claim 1, wherein the global data communications internetwork is the Internet.

65. (Previously Presented) The method of claim 21, wherein the global data communications internetwork is the Internet.

66. (Previously Presented) The program storage device of claim 26, wherein the global data communications internetwork is the Internet.

67. (Previously Presented) The apparatus of claim 45, wherein the global data communications internetwork is the Internet.

68. (Previously Presented) The network access server of claim 1 wherein the user belongs to the home domain.

69. (Previously Presented) The method of claim 21 wherein the user belongs to the home domain.

70. (Previously Presented) The program storage device of claim 26 wherein the user belongs to the home domain.

71. (Previously Presented) The apparatus of claim 45 wherein the user belongs to the home domain.

Claim 72-74 (Cancelled).

75. (New) The network access server of claim 1, wherein

the receiver is further configured to detect the status of the user connection to the NAS in response to the periodic queries from the HGS; and
the responder is configured to, in response to the detected status by the receiver:

provide to the HGS an affirmation of the user connection to the NAS when the status of the user indicates that the user is still connected to the NAS and that the previously allocated IP address for the user is in use by the user, and

provide to the HGS no affirmation of the user connection to the NAS when the status of the user indicates that the user is no longer connected to the NAS and that the previously allocated IP address for the user is not in use by the user, such non-affirmation of the user connection to the NAS causing the HGS to de-allocate the IP address previously allocated to the user from the HGS and return the IP address previously allocated to the user to the pool of IP addresses for allocation to authorized users.

76. (New) The method of claim 21, wherein

receiving comprises detecting the status of the user connection to the NAS in response to the periodic queries from the HGS; and
responding comprises:

providing to the HGS an affirmation of the user connection to the NAS when the status of the user indicates that the user is still connected to the NAS and that the previously allocated IP address for the user is in use by the user, and

providing to the HGS no affirmation of the user connection to the NAS when the status of the user indicates that the user is no longer connected to the NAS and that the previously allocated IP address for the user is not in use by the user, such non-affirmation of the user connection to the NAS causing the HGS to de-allocate the IP address previously allocated to the user from the HGS and return the IP address previously allocated to the user to the pool of IP addresses for allocation to authorized users.

77. (New) The program storage device of claim 26, wherein:

receiving comprises detecting the status of the user connection to the NAS in response to the periodic queries from the HGS; and
responding comprises:

providing to the HGS an affirmation of the user connection to the NAS when the status of the user indicates that the user is still connected to the NAS and that the previously allocated IP address for the user is in use by the user, and

providing to the HGS no affirmation of the user connection to the NAS when the status of the user indicates that the user is no longer connected to the NAS and that the previously allocated IP address for the user is not in use by the user, such non-affirmation of the user connection to the NAS causing the HGS to de-allocate the IP address previously allocated to the user from the HGS and return the IP address previously allocated to the user to the pool of IP addresses for allocation to authorized users.

78. (New) The apparatus of claim 45, wherein

means for receiving comprises means for detecting the status of the user connection to the NAS in response to the periodic queries from the HGS; and

means for responding comprises:

means for providing to the HGS an affirmation of the user connection to the NAS when the status of the user indicates that the user is still connected to the NAS and that the previously allocated IP address for the user is in use by the user; and

means for providing to the HGS no affirmation of the user connection to the NAS when the status of the user indicates that the user is no longer connected to the NAS and that the previously allocated IP address for the user is not in use by the user, such non-affirmation of the user connection to the NAS causing the HGS to de-allocate the IP address previously allocated to the user from the HGS and return the IP address previously allocated to the user to the pool of IP addresses for allocation to authorized users.